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EXAMINER	
KIM, DAVID S	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/232,119	WEITZEL, THILO	
	Examiner	Art Unit	
	David S. Kim	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-55* is/are pending in the application.

4a) Of the above claim(s) *24-26,29,31,32,35-37,46-49,51 and 52* is/are withdrawn from consideration.

5)☒ Claim(s) *44,45 and 50* is/are allowed.

6)☒ Claim(s) *21-23,27,28,30,33,34,38-43 and 53-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Applicant's compliance with the objections to the drawings in the previous Office Action (mailed on 08 February 2006) is noted and appreciated. A replacement drawing sheet for Fig. 5 was received on 12 July 2006. Fig. 5 is approved. Accordingly, the previous objection is presently withdrawn.

Specification

2. Applicant's compliance with the objections to the specification in the previous Office Action (mailed on 08 February 2006) is noted and appreciated. Applicant's amendments to the specification overcome the previous objections, which are presently withdrawn.

Claim Objections

3. Applicant's compliance with the objections to the claims in the previous Office Action (mailed on 08 February 2006) is noted and appreciated. Applicant's amendments to the claims overcome most of the previous objections. However, objections to the claims still remain.

Claim 55 is objected to because of the following informalities:

In claim 55, "an interferometer as said means structured and arranged for generating at least one reference light ray" is used where -- an interferometer as said means structured and arranged for aligning -- may be intended. That is, the previous version of claim 55 indicated said means with the reference characters (20, 30), which correspond to said "means structured and arranged for aligning" in parent claim 21.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. Applicant's response to the rejections of the claims under 35 U.S.C. 112 in the previous Office Action (mailed on 08 February 2006) is noted and appreciated. Applicant's amendments to the claims overcome some of the previous rejections under 35 U.S.C. 112. However, rejections under 35 U.S.C. 112 still remain.

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claim 54** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description and the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim(s) also contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, notice the following limitation:

"said device is structured and arranged to allow heterodyne detection of a single optical channel with defined wavelength ***without spatial separation from other optical channels of different wavelength***" (emphasis Examiner's).

However, notice prism 12 in Applicant's Fig. 2. According to the general understanding of prisms with such a shape, prism 12 would spatially separate optical channels of different wavelengths from each other. Then, after reflection from mirror 30, these channels would travel back through prism 12. However, due to the initial spatial separation of the optical channels and the angular relationship between prism 12 and mirror 30, any single, detected, optical channel with a defined wavelength would be spatially separated from other optical channels of different wavelengths. Thus, the disclosure does not teach this "without spatial separation" limitation.

Additionally, this "without spatial separation" limitation is not enabled by the disclosure. It appears that the "detection of a single optical channel with defined wavelength" depends on these features of Applicant's invention: the initial spatial separation of the optical channels and the angular relationship between prism 12 and mirror 30. That is, the "detection" feature of Applicant's invention ***depends***, at least, on spatial separation of the optical channels. Thus, there is conflict between this operating principle (the spatial separation) of Applicant's invention in Fig. 2 and the "without spatial separation" language of claim 54. This conflict implies a lack of enablement. That is, how could one make and use the invention

of claim 54, which lacks "spatial separation", if the disclosure teaches the inclusion of "spatial separation"?

7. **Claims 54-55** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Notice that claims 54-55 include "***heterodyne***" detection. However, the discussion of the embodiment of Fig. 2 (e.g., p. 10, 1st paragraph) does not expressly disclose "heterodyne" detection. Consideration of the technical aspects of Applicant's Fig. 2 leads one to wonder whether or not Applicant's Fig. 2 actually involves "heterodyne" detection.

First, let us note that heterodyne detection involves the mixing of two electromagnetic waves: one wave has one wavelength/frequency and the other wave has a different wavelength/frequency. This mixing leads to waves of sum and difference frequencies.

Next, let us consider Applicant's apparatus in Fig. 2. It appears that Applicant's apparatus in Fig. 2 functions by arranging the mixing, or interference, two electromagnetic waves: (1) the reference light from mirror 20 and (2) a particular portion (i.e., wavelength/frequency) of the spectrum of the light from mirror 30. The reference light has a frequency spectrum that is relatively broadband. The light from mirror 30 has the same spectral (frequency) components as the reference light and is also broadband. However, the particular arrangement of mirror 30 and prism 12 arranges the relevant interference of only a particular portion (i.e., wavelength) of the spectrum of the light from mirror 30 with the broadband spectrum of the reference light. Note that the wavelength of this particular portion (i.e., wavelength) of the spectrum of the light from mirror 30 is ***included*** in the broadband spectrum of the reference light.

Generally speaking, the "different wavelengths/frequencies" employed in "heterodyne" detection implies that the wavelength/frequency of one wave is ***mutually exclusive*** of the wavelength/frequency of the other wave. Under this reading of "different wavelengths/frequencies", Applicant's apparatus in Fig. 2 does not disclose "heterodyne" detection.

However, perhaps Applicant intends a looser reading of "different wavelengths/frequencies", which would imply a looser reading of "heterodyne" detection. Such a looser reading could apply to Applicant's apparatus in Fig. 2. That is, although the "wavelength/frequency" of the reference light from mirror 20 (i.e., the entire broadband spectrum) ***includes*** the "wavelength/frequency" of the particular portion of the spectrum of the light from mirror 30, these two "wavelengths/frequencies" do ***differ*** inasmuch as they are not exactly identical. Thus, there would be mixing of two "different wavelengths/frequencies", which would imply "heterodyne" detection.

If Applicant intends the former, stricter reading of "heterodyne" detection where the wavelength/frequency of one wave is ***mutually exclusive*** of the wavelength/frequency of the other wave, then the "heterodyne" detection of claims 54-55 constitutes new matter. On the other hand, if Applicant intends the latter, looser reading of "heterodyne" detection, then the "heterodyne" detection of claims 54-55 does not constitute new matter.

Additionally, in the case that Applicant considers the usage of the term "homodyne" to describe the detection of Applicant's Fig. 2, Examiner briefly notes that such usage would also present possible 112 issues.

That is, "homodyne" detection also involves the mixing of two electromagnetic waves. Both of these waves are of the same wavelength/frequency. The "same wavelength/frequency" of "homodyne" detection implies that the wavelength/frequency of one wave is ***exactly*** the same as the wavelength/frequency of the other wave. Although the two waves of Applicant's Fig. 2 both ***include*** spectral components with the same wavelength/frequency, the spectral profile of these two waves are not the same. Thus, Applicant's Fig. 2 does not disclose "homodyne" detection.

Moreover, to say that Applicant's Fig. 2 discloses both "heterodyne" and "homodyne" detection would be a contradiction of terms. That is, "hetero-" has the connotation "different" while "homo-" has the connotation "same". Simultaneous usage of both of these terms to describe the same system would be confusing to practitioners of the art.

As a simple remedy, Examiner respectfully suggests the simple removal of this "heterodyne" term and avoidance of the term "homodyne" to avoid all of these 35 U.S.C. 112 issues.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Mertz and Hecht et al.

9. **Claims 21, 27-28, 30, 33-34, 38-42, 53, and 55** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mertz (U.S. Patent No. 3,469,923) and Hecht et al. (*Optics*, hereinafter "Hecht") in view of Downs (U.S. Patent No. 5,847,828).

Regarding claim 21, Mertz and Hecht disclose:

A device for detecting optical signals, comprising

means (Mertz, beam splitter 23 in Fig. 5) structured and arranged for generating at least one reference light ray which has at least one of

(i) frequency shift or frequency modulation or both;

(ii) phase shift or phase modulation or both; and

(iii) time displacement (Mertz, relative displacement in time between the signal exiting up from 23 and the signal exiting right from 23),

all (i)-(iii) relating to the optical signal to be detected;

means (Mertz, e.g., mirrors 27 and 33, e.g., interferometer structure) structured and arranged for aligning at least one of the signals and reference light ray(s) such that they can be brought into interference; and

a detector (Mertz, photomultiplier 35) with a demodulator (Mertz, synchronous demodulator 38) being structured and arranged to detect amplitude modulation (Mertz, changes in amplitude in col. 2, l.

29-53; modulation of line 10 in col. 4, l. 63-69; fringe pattern in col. 6, l. 65-70) of a resulting signal from said interference; and

said detector (Mertz, photomultiplier 35) is structured and arranged to measure at least one of time and spatial modulation of intensity of at least part of cross-section (Hecht, cross-section on detector *D* in Fig. 9.12, p. 287; Mertz, fringe pattern in col. 6, l. 65-70) of the resulting detected signal.

Mertz and Hecht do not disclose:

wherein an angular dispersive element is structured and arranged to change angle(s) of at least one of the optical signals and reference ray(s) being brought into interference depending upon wavelength.

However, angular dispersive elements are common optical elements in interferometers like Mertz's and Hecht's. Downs shows an interferometer that implements an angular dispersive element (9 in Fig. 1). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the apparatus of Mertz and Hecht, according to the teachings of Downs, i.e., wedging the beamsplitter plate and including the angular dispersive element (Downs, 7 and 9 in Fig. 1). One of ordinary skill in the art would have been motivated to do this since the teachings of Downs provides reduction of stray reflections, which can limit accuracy and resolution in interferometers (Downs, col. 1, l. 58 – col. 2, l.36).

Regarding claim 27, Mertz and the references applied above (hereinafter the "RAA") disclose:

A device in accordance with claim 21, wherein the angular dispersive element is a dispersing optical element (Downs, prism 9 in Fig. 1).

Regarding claim 28, Mertz and the RAA disclose:

A device in accordance with claim 27, wherein said dispersing optical element is a prism (Downs, prism 9 in Fig. 1).

Regarding claim 30, Mertz and the RAA disclose:

A device in accordance with claim 21, wherein the angular dispersive element is structured and arranged to change type or degree of dependence of angle deflection by the wavelength (Downs, prism 9 in Fig. 1).

Regarding claim 33, Mertz and the RAA disclose:

A device in accordance with claim 21, additionally comprising means for deflecting (e.g., glass plate 32 reflects at least some of its incident signal) at least one of the reference light ray and optical signal.

Regarding claim 34, claim 34 is an apparatus claim that corresponds largely to the apparatus claim 21. Therefore, the recited means in apparatus claim 21 read on the corresponding means in apparatus claim 34. Claim 34 also includes limitations absent from claim 21. These limitations are:

the angular dispersive element is structured and arranged to be at least one of rotatable or tiltable.

Mertz and the RAA do not expressly disclose these limitations. However, Examiner notes that one of ordinary skill in the art would have recognized that it is technically trivial to rotate or tilt the compensator 9 of Downs. One simply rotates or tilts it. Accordingly, the compensator 9 of Mertz and the RAA would be rotatable or tiltable.

Regarding claim 38, claim 38 is an apparatus claim that corresponds largely to the apparatus claim 21. Therefore, the recited means in apparatus claim 21 read on the corresponding means in apparatus claim 38. Claim 38 also includes limitations absent from claim 21. Mertz and the RAA also disclose these limitations:

additionally comprising means (Mertz, lens 36) structured and arranged for changing the ray cross-section of at least one of the rays involved.

Regarding claim 39, claim 39 is an apparatus claim that corresponds largely to the apparatus claim 21. Therefore, the recited means in apparatus claim 21 read on the corresponding means in apparatus claim 39. Claim 39 also includes limitations absent from claim 21. Mertz and the RAA also disclose these limitations:

additionally comprising means structured and arranged for providing at least one of spectral filtration, and spatial modulation of at least one of phase (Mertz, displacement of mirror 27) and amplitude of at least one of said rays involved.

Regarding claim 40, claim 40 is an apparatus claim that corresponds largely to the apparatus claim 21. Therefore, the recited means in apparatus claim 21 read on the corresponding means in apparatus claim 40. Claim 40 also includes limitations absent from claim 21. These limitations are:

additionally comprising at least one of (a) and (b):

(a) wave guides structured and arranged such that at least part of the rays involved are guided at least partially therethrough; and

(b) at least part of the angular dispersive element being formed by integrated optics.

Mertz and the RAA do not expressly disclose these limitations. However, Examiner notes that the integration of optics is an extremely well known practice in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to form the angular dispersive element by integrated optics. One of ordinary skill in the art would have been motivated to do this for some conventional benefits of integration, such as reduced manufacturing costs, smaller apparatus size, and higher apparatus stability.

Regarding claim 41, Mertz and the RAA disclose:

A device in accordance with claim 21, which is an optical receiver (Mertz, Fig. 5 receives optical signal 26) or spectrometer (Mertz, Fig. 5 measures spectral characteristics via photomultiplier 35, spectrographic purposes in col. 3, l. 10-11).

Regarding claim 42, Mertz and the RAA disclose:

A device in accordance with claim 21, omitting a local oscillator (Mertz, Fig. 5 lacks a local oscillator).

Regarding claim 53, Mertz and the RAA disclose:

A device in accordance with claim 21, which is an optical modulator (Mertz, Fig. 5 modulates an optical signal via displacing mirror 27).

Regarding claim 55, Mertz and the RAA disclose:

The device in accordance with claim 21, comprising, in combination

an interferometer (Mertz, Fig. 5, notice interferometer structure) as said means structured and arranged for generating at least one reference light ray,

means for modulating (Mertz, e.g., displacement components in Fig. 5) one of the rays brought to interference,

heterodyne detection means constituting said detector (Mertz, photomultiplier 35), and

said angular dispersive element structured and arranged to change angle(s) of rays inside the interferometer (Downs, prism 9 in Fig. 1).

Epworth

10. **Claims 22-23 and 43** are rejected under 35 U.S.C. 103(a) as being unpatentable over Epworth (U.S. Patent No. 4,533,247) in view of Hecht and Downs.

Regarding claim 22, Epworth discloses:

A device for generating optical signals by modulation of optical carriers, comprising

means structured and arranged for generating (e.g., interferometer structure in Fig. 2a) at least one reference light ray which has at least one of

(i) frequency shift or frequency modulation or both;

(ii) phase shift or phase modulation or both; and

(iii) time displacement (relative displacement in time between the signal exiting down from 20 and the signal exiting left from 20),

all (i)-(iii) relating to the optical signal to be modulated;

means structured and arranged for aligning (e.g., mirrors 21-22, e.g., interferometer structure) the optical signal carrier and at least one of the reference light ray(s) such that they can be brought into interference; and

a coupler (e.g., means to couple output of interferometer in Fig. 2a to optical path 13) structured and arranged to collect a resulting signal from said interference and directs the signal to a further optical transmission line (e.g., optical fiber in col. 2, l. 30) where the resulting signal exhibits modulation;

the device is structured and arranged to make the thus coupled-out signal dependent upon at least one of time (amplitude modulation) or spatial modulation of intensity (changes in intensity in Fig. 6) with reference to at part of cross-section (e.g., interferometers output fringe patterns, which have a cross-section) of the resulting interference signal.

Epworth does not expressly disclose:

wherein an angular dispersive element is structured and arranged to change angle(s) of at least one of the optical signals and reference ray(s) being brought into interference, depending upon wavelength.

However, Epworth does disclose means for changing refractive index to produce an effective change in the path length (col. 2, l. 38-46, 23 in Fig. 2b). Such means generally imply the use of a medium with a different refractive index than the refractive index of the interferometer environment, i.e., air or free space. Hecht shows a variety of media with material properties that provide differing refractive indices (Hecht, Table 6.2, p. 190). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ media of such material in Epworth's means for changing refractive index to produce an effective change in the path length. One of ordinary skill in the art would have been motivated to do this since one of most common and inexpensive media for implementing such changes in refractive index is some type of optical glass. An example of the usage of this kind of medium to change refractive index to produce an effective change in the path length is shown by Hecht's compensating plates on p. 287. Moreover, angular dispersive elements are common optical elements in interferometers like Epworth's. Downs shows an interferometer that implements an angular dispersive element (9 in Fig. 1). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the apparatus of Epworth, according to the teachings of Downs, i.e., wedging the beamsplitter plate and including the angular dispersive element (Downs, 7 and 9 in Fig. 1). One of ordinary skill in the

art would have been motivated to do this since the teachings of Downs provides reduction of stray reflections, which can limit accuracy and resolution in interferometers (Downs, col. 1, l. 58 – col. 2, l.36).

Regarding claim 23, Epworth in view of Hecht and Downs does not expressly disclose:

A device in accordance with claim 22, wherein said generating means include a beam splitter and a ***frequency*** shifter or modulator.

However, notice that Epworth discloses frequency modulation for a related embodiment (col. 5, l. 18-20). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to also employ frequency modulation for the embodiment of Epworth in Fig. 2a. One of ordinary skill in the art would have been motivated to do this since the use of frequency modulation is an extremely common way to transmit information through the field of communications.

Regarding claim 43, Epworth in view of Hecht and Downs discloses:

A device in accordance with claim 22, omitting a local oscillator (Epworth, Fig. 2a lack a local oscillator).

Allowable Subject Matter

11. In a previous Office Action (mailed on 17 May 2005), Examiner indicated allowable subject matter. Applicant's incorporation of some of this allowable subject matter in new **claim 54** is noted and appreciated. However, as noted above, Applicant's amendments (filed on 21 November 2005) introduced new ground(s) for rejecting claim 54 under 35 U.S.C. 112.

12. **Claim 50** is allowed. In particular, notice the following limitation:

"a second mirror ***pivotally arranged*** on a side of said prism opposite said beam splitter to reflect back and ***select wavelength*** of a signal to be detected" (emphasis Examiner's).

Claim 50 is allowed largely due to the pivoting arrangement of the second mirror for the purpose of selecting the wavelength of the signal to be detected. To further clarify, claim 50 is not allowed simply due to the pivoting arrangement of the second mirror; such a pivoting arrangement for a second mirror of an interferometer is known in the art. For example, see the angular displacement of mirror 70 in Fig. 7 of Epworth and the angular displacement of mirror 80 in Fig. 8, also of Epworth. However, the prior art of

record does not show the pivoting arrangement of the second mirror ***for the purpose of selecting the wavelength*** of the signal to be detected. Accordingly, claim 50 is allowed.

13. **Claim 44** is allowed. See the discussion of claim 50 above for reasons on the allowability of claim 44. That is, claim 44 and 50 both contain similar allowable subject matter.

14. **Claim 45** is allowed.

15. **Claim 54** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

16. Applicant's arguments filed on 08 February 2006, with respect to the previous rejection of **claim 54** under 35 USC 112, first paragraph (enablement), have been fully considered but they are not persuasive. Applicant states,

> "Regarding the enablement rejection of Claim 54 under 35 U.S.C. 112, first paragraph, raised in paragraph 12 of the Office Action, it is respectfully pointed out that as extensively-described in the present application and drawings, it is unnecessary to spatially separate the optical channels. Thus, the inventive device attains high spectral resolution despite small size. As clearly shown, in the figures, the different optical channels, i.e., the different wavelengths, are not intended to be spatially separated. The angular dispersive element, i.e., prism 12 in Fig. 2 or grating 11 in Figs. 3 and 4, changes the angle of the transmitted or refracted beam according to wavelength. The beam has a certain diameter with the angular variation naturally being small.
>
> If the angularly-dispersed beams are followed to infinite distance, then there would be spatial separation; if the beams were refocused, then there would be spatial separation of the beams in the focal plane. However, near the angular dispersive element 11-14, the beam possesses angular dispersion according to variation in wavelength, with the different optical channels, i.e., different wavelengths, clearly not spatially separated. Thus, according to the operating principles of the present invention, it is possible to detect a certain interference pattern according to a certain wavelength (Figs. 1a and b), even with superimposing a multitude of other interference patterns (Figs. 2c and d), without need to spatially separate the different wavelengths or optical channels" (emphasis Applicant's, p. 23-24).

However, Applicant's own specification appears to suggest that there would be spatial separation. That is, the specification suggests that, in spectrometers with dispersing or diffracting elements, different spectral components do spatially separate (p. 9, 1st full paragraph). Although the specification may disclose that it is unnecessary to spatially separate the optical channels (p. 9, 1st full paragraph), it is not clear which teachings of the specification specifically enable this limitation. Furthermore, the treatment of claim 54 above under 35 USC 112, first paragraph, further details Examiner's points: (1) prism 12 in Applicant's

Fig. 2 is a dispersing element that spatially separates optical channels of different wavelengths from each other and (2) the "detection of a single optical channel with defined wavelength" depends on these features of Applicant's invention: the initial spatial separation of the optical channels and the angular relationship between prism 12 and mirror 30. Accordingly, Applicant's arguments are unpersuasive.

As a remedy, perhaps simple removal of this contested limitation would suffice. That is, notice paragraph item 24 in the Office Action mailed on 17 May 2005, which indicates allowable subject matter. Even if claim 54 did not contain this contested limitation, claim 54 could still be allowable if it contains the indicated allowable subject matter.

17. Applicant's arguments filed on 08 February 2006, with respect to the previous rejection of **claims 54-55** under 35 USC 112, first paragraph (written description), have been fully considered but they are not persuasive. Applicant states,

> "Furthermore, with respect to the enablement rejection of Claims 54 and 55 under 35 U.S.C. 112, first paragraph, raised in paragraph 12 of the Office Action, it is respectfully pointed out Figs. 2-4 (and the accompanying description in the specification) most certainly illustrate heterodyne detection because the part of the incoming light, after modulation, is used as an additional local source. Accordingly, the only outstanding issue is the art rejection of the claims" (emphasis Applicant's, p. 23-24).

Examiner respectfully notes that the use of a local source, additional or not, in a detection technique is not equivalent to heterodyne detection. Rather, heterodyne detection is more directly characterized by the mixing of two electromagnetic waves: one wave has one wavelength/frequency and the other wave has a different wavelength/frequency. In other words, heterodyne detection is not defined by the use of an additional local source. Accordingly, Applicant's arguments are unpersuasive.

18. Applicant's arguments filed on 08 February 2006, with respect to the previous rejection of **claims under Mertz, Hecht, and Epworth under 35 USC 102 and 103**, have been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments are based on the newly introduced limitation regarding an "angular dispersive element". This limitation is addressed by the new references to Downs.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Williams is cited to show another example of an interferometer that employs an angular dispersive element (Fig. 5).

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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DSK

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER

REPLACEMENT SHEET

Approved by DSK
22 SEPTEMBER 2006

Fig. 5, showing the coupler